BIRCH, STEWART, KOLASCH & BIRCH, LLP

INTELLECTUAL PROPERTY LAW
8110 GATEHOUSE ROAD
SUITE 500 EAST
FALLS CHURCH, VA 22042-1210
U S A
(703) 205-8000

FAX: (703) 205-8050
(703) 698-8590 (G IV)

e-mail: mailroom@bskb.com
web: http://www.bskb.com

CALIFORNIA OFFICE:
COSTA MESA, CALIFORNIA

TERRELL C. BIRCH
RAYMOND C. STEWART
JOSEPH A. KOLASCH
JAMES M. SLATTERY
BERNARD L. SWEENEY*
MICHAEL K. MUTTER
CHARLES GORENSTEIN
GERALD M. MURPHY, JR.
LEONARD R. SVENSSON
TERRY L. CLARK
ANDREW D. MEIKLE
MARC S. WEINER
JOE MCKINNEY MUNCY
ROBERT J. KENNEY
DONALD J. DALEY
JOHN W. BAILEY
JOHN A. CASTELLANO, III
GARY D. YACURA

OF COUNSEL:
HERBERT M. BIRCH (1905-1996)
ELLIOT A. GOLDBERG*
WILLIAM L. GATES*
EDWARD H. VALANCE
RUPERT J. BRADY (RET.)*

*ADMITTED TO A BAR OTHER THAN VA

THOMAS S. AUCHTERLONIE
MICHAEL R. CAMMARATA
JAMES T. ELLER, JR.
SCOTT L. LOWE
MARK J. NUELL, PH.D.
DARIN E. BARTHOLOMEW*
D. RICHARD ANDERSON
PAUL C. LEWIS
W. KARL RENNER
MARK W. MILSTEAD*
JOHN CAMPA*

REG. PATENT AGENTS:
FREDERICK R. HANDREN
ANDREW J. TELESZ, JR.
MARYANNE ARMSTRONG, PH.D.
MAKI HATSUMI
MIKE S. RYU
CRAIG A. McROBBIE
GARTH M. DAHLEN, PH.D.
LAURA C. LUTZ
ROBERT E. GOOZNER, PH.D.
HYUNG N. SOHN
MATTHEW J. LATTIG
ALAN PEDERSEN-GILES
JUSTIN D. KARJALA
C. KEITH MONTGOMERY
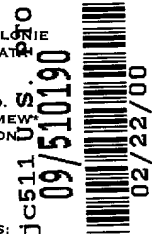
Date: <u>February 22, 2000</u>
Docket No.: <u>2091-0208P</u>

Assistant Commissioner for Patents
Box PATENT APPLICATION
Washington, D.C.   20231

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s):   ITO, Wataru

For: METHOD, APPARATUS AND RECORDING MEDIUM FOR IMAGE PROCESSING

Enclosed are:

__X__ A specification consisting of <u>12</u> pages

__X__ <u>3</u> sheet(s) of <u>Formal</u> drawings

__X__ An assignment of the invention

__X__ Certified copy of Priority Document(s)

__X__ Executed Declaration   __X__ Original   ___ Photocopy

_____ A verified statement to establish small entity status under 37
       CFR 1.9 and 37 CFR 1.27

_____ Preliminary Amendment

__X__ Information Disclosure Statement, PTO-1449 and reference(s)

___ Other _____

The filing fee has been calculated as shown below:

			LARGE ENTITY		SMALL ENTITY	
FOR	NO. FILED	NO. EXTRA	RATE	FEE	RATE	FEE
BASIC FEE	********** ********** **********	********** ********** **********	***** ***** *****	$690.00	or	**** **** ****	$345.00
TOTAL CLAIMS	3 - 20 =	0	x18 =$	0.00	or	x 9 = $	0.00
INDEPENDENT	3 - 3 =	0	x78 =$	0.00	or	x 39 = $	0.00
MULTIPLE DEPENDENT CLAIM PRESENTED no			+260 = $	0.00	or	+130 = $	0.00

TOTAL $ 690.00   TOTAL $ 0.00

_X_   A check in the amount of $__730.00__ to cover the filing fee and recording fee (if applicable) is enclosed.

____   Please charge Deposit Account No. 02-2448 in the amount of $_____. A triplicate copy of this transmittal form is enclosed.

____   No fee is enclosed.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. 1.16 or under 37 C.F.R. 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By_____
   MICHAEL K. MUTTER
   Reg. No. 29,680
   P. O. Box 747
(703) 205-8000   Falls Church, Virginia 22040-0747
MKM/dll

METHOD, APPARATUS AND RECORDING MEDIUM FOR IMAGE PROCESSING

BACKGROUND OF THE INVENTION

Filed of the Invention

5   The present invention relates to an image processing
method and an image processing apparatus for carrying out image
processing on an image including a figure, and also to a
computer-readable recording medium storing a program to cause
a computer to execute the image processing method.

Description of the Related Art

10   When a portrait is viewed, most attention is paid to the
face of the person therein. In order to generate a high-quality
photograph, the color and/or density of the face of a figure
in the photograph needs to be corrected. Therefore, a method
of generating a portrait having appropriate color and/or density

15   of the face of a figure therein has been proposed (see Japanese
Unexamined Patent Publication No. 6(1994)-67320, for example).
In this method, a candidate area for a face is extracted by
dividing a portrait based on distributions of hue and chroma

20   values of the portrait and a face area is extracted based on
a shape of an area positioned close to the candidate area. By
determining exposure of a photosensitive material based on color
and/or density of the face area, color and density of the face
of the person become appropriate. Another method of generating

25   a photograph including a figure whose face has appropriate color

1

and/or density has also been proposed (see Japanese Unexamined Patent Publication No. 8(1996)-110603). In this method, a face area of a figure is extracted from a photograph generated in uneven lighting due to shade or a flash, and exposure is determined by removing the illumination variance from the face area. In this manner, each face has appropriate color and/or density in the photograph.

However, in recognition of color and density of a target area, it has been known that human vision is affected by color and density of areas surrounding the target area (Color Appearance Model, M. D. Fairchild, ADDISON-WESLEY, 1998). In other words, when surroundings are dark, an object therein looks light, while the object looks dark when the surroundings are light, even if the density of the object is actually the same in both cases. For example, when two areas having the same gray density are viewed in equal-density backgrounds, the two areas are perceived to have the same density. However, when the same areas are viewed on black and white backgrounds respectively, the density is perceived to be different between the two areas.

Therefore, even if the processing for appropriately correcting color and density of the face area is carried out as described in Japanese Unexamined Patent Publication Nos. 6(1994)-67320 and 8(1996)-110603, the color and the density of the face area may not become appropriate due to the effect caused by color and density of areas surrounding the face area.

2

SUMMARY OF THE INVENTION

The present invention has been conceived based on consideration of the above problems. An object of the present invention is to provide an image processing method and an image processing apparatus for carrying out image processing causing color and/or density of the face of a person to become appropriate without being affected by the surroundings, and also to provide a computer-readable recording medium storing a program to cause a computer to execute the image processing method.

An image processing method of the present invention is a method of carrying out image processing on an image including a figure, and the image processing method comprises the steps of:

extracting a face area of the figure from the image; and

adjusting density and/or color of the face area based on density information and/or color information of an area surrounding the face area.

As a method of "extracting the face area", not only the methods described in Japanese Unexamined Patent Publication Nos. 6(1994)-67320 and 8(1996)-110603 but also a method of manual extraction of a face area by an operator using a light pen and a method of extracting a face area by using a neural network described in Japanese Unexamined Patent Publication No. 5(1993)-274438 or 5(1993)-307605 may be used, for example.

An image processing apparatus of the present invention is

3

an apparatus for carrying out image processing on an image including a figure, and the image processing apparatus comprises:

face area extracting means for extracting a face area of the figure from the image; and

adjusting means for adjusting density and/or color of the face area based on density information and/or color information of an area surrounding the face area.

The image processing method of the present invention may be provided as a program recorded in a computer-readable recording medium to cause a computer to execute the processing.

According to the present invention, since the density and/or the color of the face area is adjusted by using the density and/or color information of the surrounding area, the density and/or the color of the face area can be perceived appropriately without being affected by the density and the color of the surrounding area.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing an outline configuration of an image processing apparatus according to an embodiment of the present invention;

Figure 2 is a diagram for explaining detection of color and/or density of an area surrounding a face area (part 1);

Figure 3 is a diagram for explaining detection of the color and/or density of the surrounding area (part 2);

4

Figure 4 is a graph showing a function used in an operation for adjusting density; and

Figure 5 is a flow chart showing an operation of the embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, an embodiment of the present invention will be explained with reference to the accompanying drawings.

Figure 1 is a block diagram showing an outline configuration of an image processing apparatus according to the embodiment of the present invention. As shown in Figure 1, an image processing apparatus 1 according to this embodiment is for carrying out processing on image data S0 representing an image including a figure obtained by image generating means 2 such as a digital camera or a scanner. The image processing apparatus 1 comprises face area extracting means 3 for extracting a face area A1 of the figure from the image represented by the image data S0, surrounding color density detecting means 4 for detecting color and/or density (hereinafter called color density) of an area surrounding the face area A1 as color density information H, and adjusting means 5 for obtaining processed image data S2 by carrying out processing for adjusting color density on image data S1 representing the face area A1 extracted by the face area extracting means 3, based on the color density information H of the area surrounding the face area A1 detected by the surrounding color density detecting means 4. The

5

processed image data S2 are output by output means 6 such as a printer or a monitor.

In the face area extracting means 3, the face area is extracted by using a conventional method. As this method, the methods described in Japanese Unexamined Patent Publication Nos. 6(1994)-67320 and 8(1996)-110603, or the method of manual extraction of the face area by an operator using a light pen, or the method of extracting the face area by using the neural network described in Japanese Unexamined Patent Publication No. 5(1993)-274438 or 5(1993)-307605 can be used, for example.

The surrounding color density detecting means 4 determines the area surrounding the face area A1 extracted by the face area extracting means 3, and calculates an average density of pixels in the surrounding area as the color density information H. More specifically, for example, in the case where the face area A1 is extracted as a circular area shown in Figure 2, a concentric area excluding the face area A1 and having a radius 3r, which is 3 times a radius r of the face area A1, is set as a surrounding area A2. The average density of the surrounding area A2 is calculated as the color density information H. When the average is calculated, it is preferable for any pixels having high saturation to be excluded. Furthermore, as shown in Figure 3, the surrounding area A2 may be divided into eight areas so that a median of averages of the density of pixels in the eight areas is calculated. In this manner, fluctuation of the density of

6

the surrounding area A2 caused by a minute high-saturation area is prevented. Moreover, the surrounding color density area detecting means 4 may find color of the surrounding area A2 and include information regarding the color in the color density information H.

The adjusting means 5 adjusts density of the face image data S1 representing the face area A1, based on the color density information H of the surrounding area A2 found by the surrounding color density detecting means 4. For example, when the density of the surrounding area A2, which is the average found in the above manner, is Q and when the density of the face area A1 is K, a signal value of each pixel in the face area A1 is adjusted according to the following equation (1):

$$K_{new} = K + \beta (Q-K) \tag{1}$$

In Equation (1), K_{new} is a pixel value after the processing, and β is a table as shown in Figure 4. By carrying out an operation shown by Equation (1), the density of the face area A1 is corrected to become higher if the density of the surrounding area is higher than the density of A1. If the density of the surrounding area is lower than the density of the face area A1, the density of the face area A1 is lowered. In the above equation, β may be a constant. Furthermore, the signal value of each pixel in the face area A1 may be corrected according to the following equation (2):

$$K_{new} = K + \alpha \cdot \beta (Q-K) \tag{2}$$

7

In Equation (2), α is a function whose value changes in accordance with the color of the face area A1. The closer to skin color the hue of the pixel having the value K becomes in a chromaticity diagram, the closer to 1 the value α becomes. The value α becomes closer to 0 the more the hue is different from the skin color. In this manner, even in the case where the face area A1 is extracted as an area including not only a skin-color portion but also hair or the like, the density of the skin-color area is corrected substantially in the face area A1. Therefore, the density is not changed unnaturally at a border of the face area A1.

In the adjusting means 5, the density of the face area A1 may be corrected by using not only Equations (1) and (2) but also a table showing a relationship between K_{new} and Q-K generated in advance. In the case where the density information H includes information regarding color of the surrounding area A2, the color of the face area A1 may be corrected based on the color of the surrounding area A2. For example, when the surrounding area A2 is blue, the complexion looks pale since the color of the face area A1 is perceived to be bluish. Therefore, it is preferable for the color of the face area A1 to be converted into a reddish color. Furthermore, only the color of the face area A1 may be corrected based on the color of the surrounding area A2, by letting the color density information H be information regarding color only.

8

An operation of the present invention will be explained next. Figure 5 is a flow a chart showing the operation of this embodiment. The image data S0 generated by the image generating means 2 are input to the image processing apparatus 1 (Step 1). In the image processing apparatus 1, the face area extracting means 3 extracts the face area A1 of a figure (Step S2). The image data representing the face area A1 are the image data S1. The surrounding color density detecting means 4 detects the color density information H of the area surrounding the face area A1 (Step S3). Based on the color density information H, the adjusting means 5 adjusts the color density of the face area A1 as has been described above, and the processed image data S2 are obtained (Step S4). The processed image data S2 are output by the output means 6 (Step S5).

As has been described above, according to this embodiment, the color density of the face area A1 is corrected based on the color density of the area surrounding the face area A1. Therefore, the face area A1 can be corrected to have appropriate color density, without being affected by the color density of the surrounding area.

In the above embodiment, the processing is carried out on the image data S0 obtained by the image generating means 2. However, the processing may be carried out on an image having been corrected to have appropriate density of the face area A1 according to the method described in Japanese Unexamined Patent

9

Publication No. 6(1994)-67320 or 8(1996)-110603. In this case,

face area extracting means of an apparatus for carrying out the

above method can be used as the face area extracting means of

the present invention.

What is claimed is:

1. An image processing method for carrying out image processing on an image including a figure, the image processing method comprising the steps of:

extracting a face area of the figure from the image; and

adjusting density and/or color of the face area based on density information and/or color information of an area surrounding the face area.

2. An image processing apparatus for carrying out image processing on an image including a figure, the image processing apparatus comprising:

face area extracting means for extracting a face area of the figure from the image; and

adjusting means for adjusting density and/or color of the face area, based on density information and/or color information of an area surrounding the face area.

3. A computer-readable recording medium storing a program to cause a computer to execute a method of carrying out image processing on an image including a figure, the program comprising the procedures of:
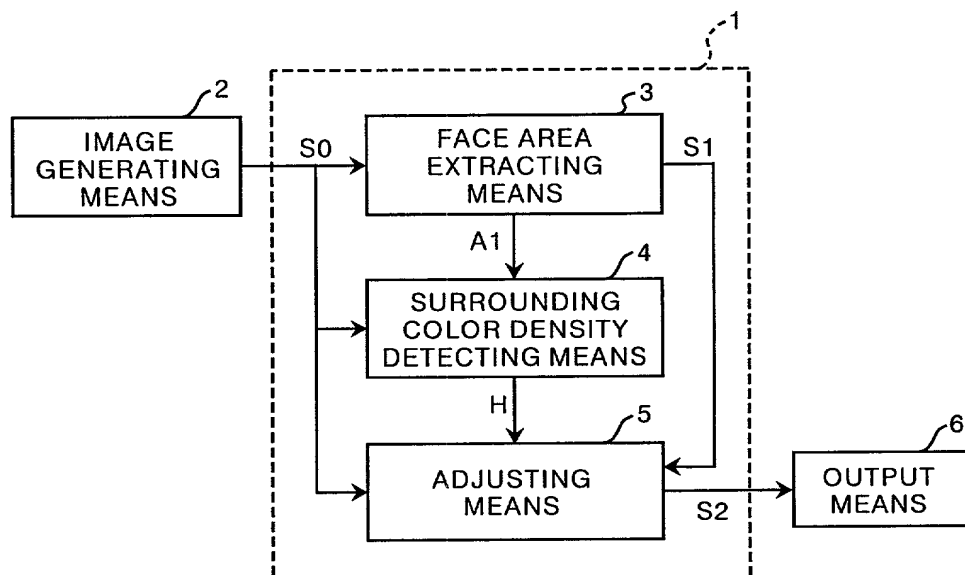
extracting a face area of the figure from the image; and

adjusting density and/or color of the face area based on density information and/or color information of an area surrounding the face area.

11

ABSTRACT OF THE DISCLOSURE

A face area in an image including a figure is perceived to have appropriate color and/or density without being affected by color and/or density of an area surrounding the face area. Face area extracting means extracts a face area from an image including a figure, and surrounding color density detecting means detects color density information indicating color and/or density (color density) of an area surrounding the face area. Adjusting means adjusts color density of the face area based on the color density information detected by the surrounding color density information detecting means. By reproducing the image after the adjustment, the face area is perceived to have appropriate color density without being affected by the color density of the surrounding area.

5

10

12

FIG.1


```
IMAGE
GENERATING  ──S0──►  FACE AREA   ──S1──►
MEANS            3   EXTRACTING
  2                  MEANS
                        │
                        A1
                        ▼
                     SURROUNDING     4
                     COLOR DENSITY
                     DETECTING MEANS
                        │
                        H
                        ▼
                     ADJUSTING       5    ──S2──►  OUTPUT
                     MEANS                          MEANS
                                                     6
```

FIG.2

FIG.3

FIG.4

FIG.5

```
        ( START )
             │
             ▼            S1
  ┌─────────────────────┐
  │   INPUT IMAGE DATA   │
  └─────────────────────┘
             │
             ▼            S2
  ┌─────────────────────┐
  │       EXTRACT        │
  │      FACE AREA       │
  └─────────────────────┘
             │
             ▼            S3
  ┌─────────────────────┐
  │ DETECT COLOR DENSITY │
  │ OF AREA SURROUNDING  │
  │      FACE AREA       │
  └─────────────────────┘
             │
             ▼            S4
  ┌─────────────────────┐
  │    ADJUST COLOR      │
  │   DENSITY OF FACE    │
  │        AREA          │
  └─────────────────────┘
             │
             ▼            S5
  ┌─────────────────────┐
  │       OUTPUT         │
  └─────────────────────┘
             │
             ▼
         (  END  )
```
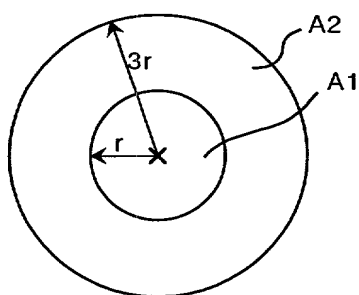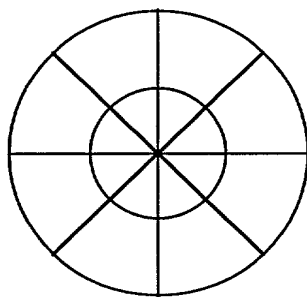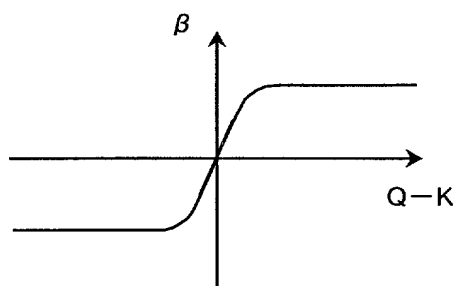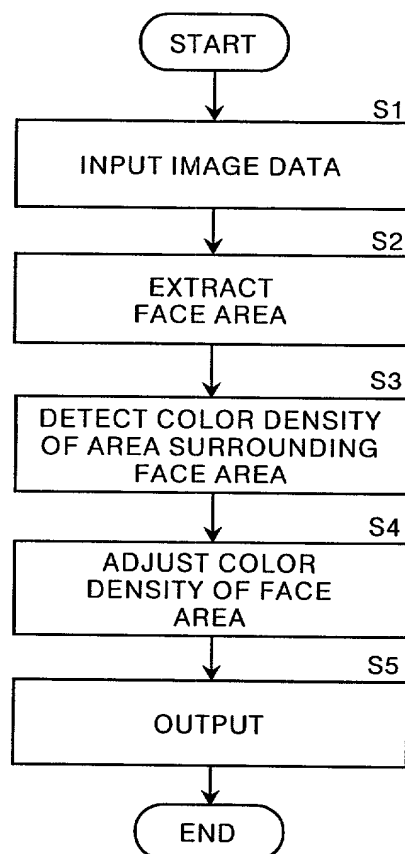
Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

Wataru Ito

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name. c/o Fuji Photo Film Co., Ltd., 798 Miyanodai, Kaisei-machi, Ashigarakami-gun, Kanagawa-ken, Japan

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"METHOD, APPARATUS AND RECORDING

MEDIUM FOR IMAGE PROCESSING"

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☐ __月__日に提出され、米国出願番号または特許協定条約国際出願番号を_____とし、
（該当する場合）_____に訂正されました。

☐ was filed on _____
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第３７編第１条５６項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration
（日本語宣言書）

私は、米国法典第３５編１１９条 (a) - (d) 項又は３６５条 (b) 項に基き下記の、米国以外の国の少なくとも一ヵ国を指定している特許協力条約 ３６５ (a) 項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)
外国での先行出願

(patent) 41445/1999	Japan	19/02/1999	Priority Not Claimed 優先権主張なし
(Number) （番号）	(Country) （国名）	(Day/Month/Year Filed) （出願年月日）	☐
(Number) （番号）	(Country) （国名）	(Day/Month/Year Filed) （出願年月日）	☐

私は、第３５編米国法典１１９条 (e) 項に基いて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) （出願番号）	(Filing Date) （出願日）	(Application No.) （出願番号）	(Filing Date) （出願日）

私は、下記の米国法典第３５編１２０条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約３６５条 (c) に基ずく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第３５編１１２条第１項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第３７編１条５６項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Application No.) （出願番号）	(Filing Date) （出願日）	(Status: Patented, Pending, Abandoned) （現況：特許許可済、係属中、放棄済）
(Application No.) （出願番号）	(Filing Date) （出願日）	(Status: Patented, Pending, Abandoned) （現況：特許許可済、係属中、放棄済）

私は、私自身の知識に基ずいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基ずく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第１８編第１００１条に基ずき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Japanese Language Declaration
(日本語宣言書)

委任状：　私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。（弁護士、または代理人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith *(list name and registration number)*

TERRELL C. BIRCH (Reg. No. 19,382)
RAYMOND C. STEWART (Reg. No. 21,066)
JOSEPH A. KOLASCH (Reg. No. 22,463)
ANTHONY L. BIRCH (Reg. No. 26,122)

JAMES M. SLATTERY (Reg. No. 28,380)
BERNARD L. SWEENEY (Reg. No. 24,448)
MICHAEL K. MUTTER (Reg. No. 29,680)
CHARLES GORENSTEIN (Reg. No. 29,271)

GERALD M. MURPHY (Reg. No. 28,977)
LEONARD R. SVENSSON (Reg. No. 30,330)
TERRY L. CLARK (Reg. No. 32,644)
ANDREW D. MEIKLE (Reg. No. 32,868)

MARC S. WEINER (Reg. No. 32,181)
ANDREW F. REISH (Reg. No. 33,443)
JOE M. MUNCY (Reg. No. 32,334)
C. JOSEPH FARACI (Reg. No. 32,350)

書類送付先

Send Correspondence to:

BIRCH, STEWART, KOLASCH & BIRCH, LLP
P.O. BOX 747
FALLS CHURCH, VA 22040-0747
TEL: (703) 205-8000

直接電話連絡先：　（名前及び電話番号）

Direct Telephone Calls to: *(name and telephone number)*

BIRCH, STEWART, KOLASCH & BIRCH, LLP
TEL: (703) 205-8000

唯一または第一発明者名		Full name of sole or first inventor
		Wataru Ito
発明者の署名	日付	Inventor's signature	Date February 15, 2000
住所		Residence Kaisei-machi, Japan
国籍		Citizenship Japan
私書箱		Post Office Address c/o Fuji Photo Film Co., Ltd., 798 Miyanodai, Kaisei-machi, Ashigarakami-gun, Kanagawa-ken, Japan
第二共同発明者		Full name of second joint inventor, if any
第二共同発明者	日付	Second inventor's signature	Date
住所		Residence
国籍		Citizenship
私書箱		Post Office Address

（第三以降の共同発明者についても同様に記載し、署名をすること）

(Supply similar information and signature for third and subsequent joint inventors.)